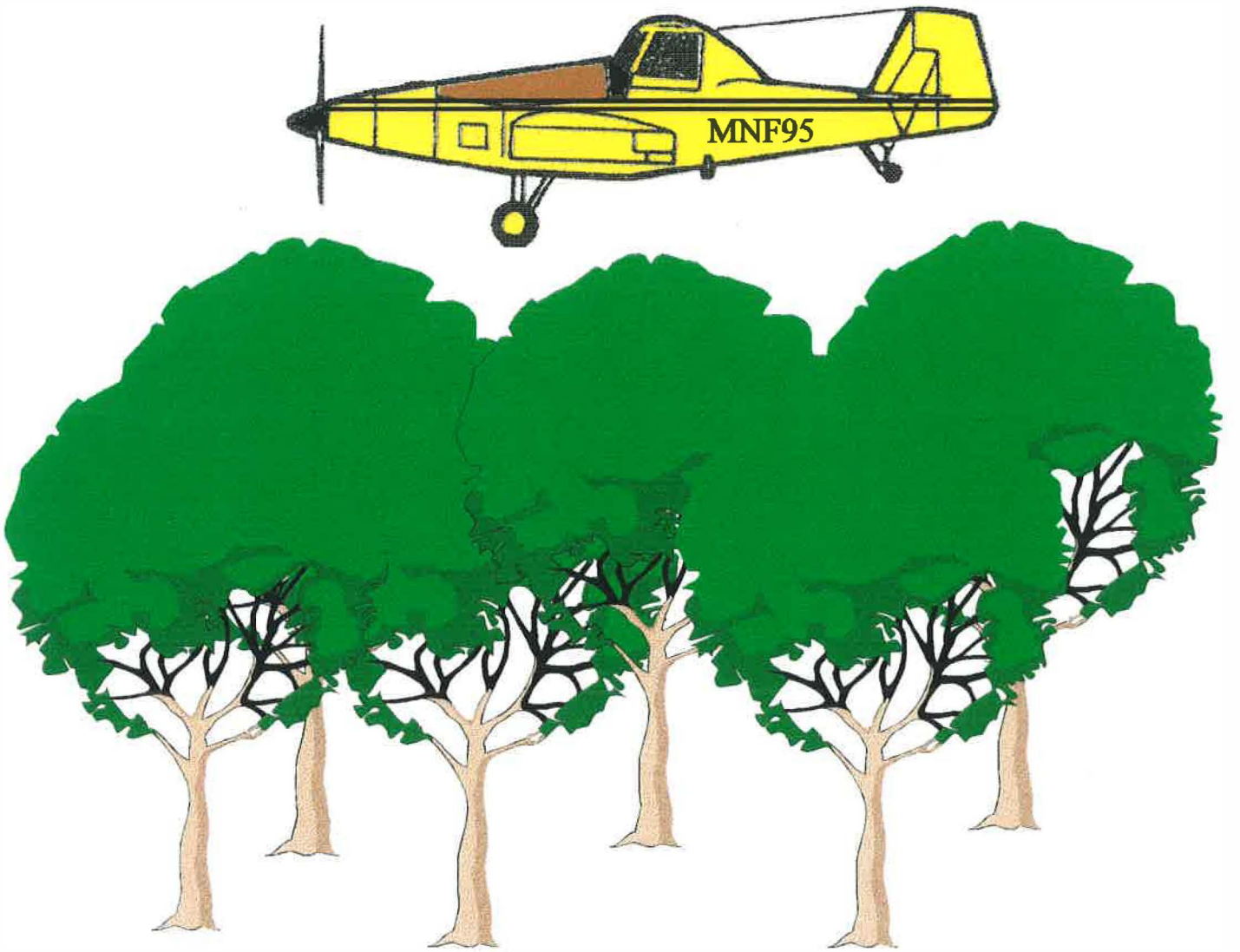
1995 Gypsy Moth Suppression Project Monongahela National Forest



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Forest Health Protection

1995 GYPSY MOTH SUPPRESSION PROJECT
MONONGAHELA NATIONAL FOREST

SUMMARY

From May 7 to June 4, 1995, approximately 15,171 acres of the Monongahela National Forest were aerially treated to reduce gypsy moth populations and to prevent noticeable defoliation.

Two biological insecticides were used on the project: *Bacillus thuringiensis* (*B.t.*) and the nucleopolyhedrosis virus (NPV) product better known as Gypchek. Approximately 984 acres were treated with a double application of Gypchek, applied at the rate of 128 ounces per acre per application. Approximately 14,187 acres were treated with *B.t.*, either a double application of 64 ounces per acre per application or a single application of 96 ounces per acre. Foray® 48B was the formulation of *B.t.* used for the project and was applied undiluted.

PROJECT PARTICIPANTS

The project was a coordinated effort between the Monongahela National Forest (MNF), Forest Health Protection (FHP) Morgantown Field Office, and Bob Ruhe Ag Service. The MNF and FHP are both part of the United States Department of Agriculture and the United States Forest Service. The project also required extensive coordination and cooperation internally on the MNF. Appendix A presents the names of those individuals who were directly involved on the project. The specific agency responsibilities and key contacts follow.

MONONGAHELA NATIONAL FOREST

MNF personnel prepared a site-specific environmental assessment, developed and administered the spray contract and selected areas on the Forest to be treated. MNF personnel also notified the local public about the spray project and held public meetings to discuss the project's location, objectives, insecticides and to address the health concerns of the public. During the actual treatment, the MNF provided support crews to deploy helium-filled balloons used to mark spray blocks and also provided an aerial observer to monitor spray deposit. MNF personnel also assisted in the monitoring of larval and foliage development, both pre-treatment and during the treatment, and also assisted in recording weather conditions during treatment. MNF personnel will also assist in the post-treatment evaluation of the project by monitoring the burlap banding sites and by conducting egg mass surveys.

Key Contact: Gary Bustamente

FOREST HEALTH PROTECTION

FHP personnel provided technical support during the planning and implementation phases of the project. FHP personnel assisted in the development of both the spray contract and the environmental assessment and provided technical expertise at the public meetings. FHP personnnel developed the safety plan and the suppression report, digitized the spray blocks, and made print outs of the AG-NAV files. During treatment, FHP personnel assisted in the deployment of the marker balloons, deployed and analyzed spray deposit cards, kept aircraft loading records and recorded weather conditions. FHP personnel were also responsible for calibrating and characterizing the spray aircraft and monitoring insect and foliage development. FHP personnel will assist in the post-treatment evaluation by conducting an aerial defoliation survey, photo interpretation of the photo mission and analyzing the results of the burlap banding and the egg mass survey.

Key Contact: Rod Whiteman

BOB RUHE AG SERVICE

The contractor provided FAA approved spray planes and pilots and a Forest Service (FS) approved observation aircraft and pilot in accordance with the contract. Bob Ruhe Ag Service subcontracted for the observation aircraft and pilot with Windancer Aviation of Elkins, WV, and also with Professional Pilots of Winchester, VA. The contractor also provided the *B.t.*, loading equipment and ground support personnel. In accordance with the contract, Bob Ruhe Ag Service provided a DGPS to help guide the spray aircraft and record flight paths.

Key Contact: Roy Vennekotter

PROJECT AND TREATMENT AREAS

The suppression project was divided into 18 treatment blocks, totaling approximately 15,171 acres (Appendix B). Logistically, the project was divided by Ranger Districts. Treatment blocks 501-503 were on the Potomac Ranger District and were located in the Upper Tract and Franklin areas. Treatment block 301 was on the Greenbrier Ranger District and was located in the Green Bank area. The majority of the treatment blocks, blocks 101-113, were on the Cheat Ranger District and were located in the St. George, Parsons and Kerens areas.

AIRCRAFT AND EQUIPMENT

Bob Ruhe Ag Service provided two Turbine Thrushes equipped with 8006 nozzles. These ships were calibrated and characterized at Bob Ruhe Ag Service in Leipsic, Ohio, on April 6. A summary of the spray aircraft data follows.

Aircraft:	(2) S2R Turbine Thrushes		
FAA Number:	N86HD and N5055X		
Pilots:	Roy Vennekotter and Roy Staley		
Speed:	125 mph		
Swath Width:	100 feet		
Release Height:	50-100 feet above canopy		
Boom Pressure:	40 psi		
Coverage:	25.25 acres/minute		
DGPS Brand:	AG-NAV		
Nozzle Type:	8006		
Application Rate:	64 oz.	96 oz.	128 oz.
Number of Nozzles:	23	34	42
Desired Flow Rate:	12.63 glm	18.94 glm	25.25 glm

The spray project was staged from the eastern portion of the airplane parking ramp at the Elkins (Randolph County) Airport. The *B.t.* was delivered in three large bulk tanks on May 12, 22 and 25 and in twelve 55 gallon drums on June 2. The *B.t.* was metered directly from the bulk tanks and 55 gallon drums into the spray planes. The Gypchek carrier was delivered in 55 gallon drums on April 19 and 27. The virus was delivered by FHP personnel on April 21 and refrigerated until used. The Gypchek virus, carrier, and water were simultaneously loaded in the spray plane and agitated while ferrying to the treatment blocks. Turn around time between loads was usually accomplished in 14-16 minutes.

SAFETY

A safety meeting was held on May 5 to inform all ground support personnel involved on the project about potential hazardous situations, location of the treatment areas, insecticides, location of medical centers and hospitals, etc.

A safety briefing was held for all pilots to alert them of potential hazards such as high power lines, high towers, general air traffic, and air traffic from other suppression projects.

The project was completed without any accidents or incidents.

LARVAE AND FOLIAGE DEVELOPMENT MONITORING

To ensure a properly timed treatment, larvae and foliage development was monitored in each treatment block prior to the day of treatment and also the day of treatment. The treatment day development data is presented in Appendix C.

TREATMENT MONITORING

The spray project was monitored from the air and the ground to make sure that the spray material was coming down inside the blocks; the spray equipment was functioning properly; no areas inside the treatment blocks were missed; the spray pilots were not entering no-fly zones; and to inform the spray pilot of any aerial hazards in the immediate vicinity.

A Cessna 177 (FAA# N3264T) was used as the observation aircraft until May 27 and a Cessna 172RG (FAA# N6418R) was used as the observation aircraft after that date.

The use of DGPS on the project enhanced the monitoring efforts. By using DGPS, a permanent record was created showing the planes' flight path. This eliminated most of the missed areas inside a spray block, reduced the amount of area outside the treatment blocks that were sprayed, and showed if a spray plane flew into a no-fly zone.

WEATHER MONITORING

Forecasts were obtained from the National Weather Service, local and national media, and MNF fire weather prior to each "targeted" spray date in order to evaluate potential spray conditions and to assist planning activities.

During treatment, weather conditions were monitored and recorded by FS personnel and are presented in Appendix D.

POST-TREATMENT MONITORING

Post-treatment evaluations of the suppression project will include monitoring of burlap bands located in the treatment areas and untreated areas (controls), an aerial defoliation survey, photo interpretation of the aerial photography, and an egg mass survey. The burlap banding will be monitored in June and early July; the defoliation survey and aerial photography mission will be conducted in July; and the egg mass survey will be conducted from late August to late November. The results of this post-treatment monitoring will be reported when available.

COMMUNICATIONS

Communications between the observation aircraft, FS personnel in the treatment areas and FS personnel at the airport was conducted through the MNF radio net system using either hand-held or vehicular mounted radios. Communications between the spray aircrafts and the observation plane were conducted by means of aircraft radios using the frequency 123.45.

PROJECT NARRATIVE

May 4 — With the project scheduled to start on May 5, the observation plane (N3264T) piloted by Jim Dugan and one spray aircraft (N86HD) piloted by Roy Vennekotter arrived at the airport around 1800. Only one spray plane was needed because only two small spray blocks, totaling 343 acres, were biologically ready to be treated. The spray plane was flown over a card line to ensure there were no malfunctioning nozzles, the VMD was between 150-200 microns and the swath width was 100 feet. The pilots were briefed on the next day's mission and on safety.

May 5 — Inclement weather prohibited any treatment. A safety meeting was held in Parsons and was attended by all FS personnel on the project.

May 6 — Like May 5, inclement weather prohibited any treatment.

May 7 — The weather finally cooperated so the first application of Gypchek was applied in blocks 501 and 502. Excellent spray conditions existed during the treatment. The second application in these blocks was scheduled for May 11. Based on larvae and foliage development, the other treatment blocks will not be treated until sometime after May 11.

Due to previous commitments, the contractor was not able to provide a base station for the MNF at this time. The spray plane was able to receive GPS signals transmitted by the Coast Guard while treating these blocks. However, these spray blocks were shown mysteriously shifted by 300-400 feet. It was thought that this was caused by the distance away from the Coast Guard's GPS station.

May 11 — Inclement weather forced the cancellation of the day's scheduled treatment plans. The next potential spray date is May 12.

May 12 — Inclement weather delayed the second application of Gypchek in blocks 501 and 502 until the evening. Larvae and foliage development is not advanced enough to allow treatment in other blocks. The blocks will be monitored on a regular basis.

To no one's surprise, the blocks are still shown shifted by 300-400 feet.

May 15 — Larvae and foliage development is progressing slowly in most of the blocks. However, development in the lower portion of block 503 and in block 104 has progressed enough to allow treatment. In the evening, the lower portion of block 503 was sprayed with the first application of Gypchek. Approximately 210 acres were treated for the day. Block 104 is scheduled to be treated tomorrow.

The DGPS base station is available and is deployed in Olson fire tower. Due to the topography and distance between block 503 and the base station, the plane is not receiving signals from the base station.

May 16 Fog delays the spray plane from departing until 0811. Block 104 is treated after the fog lifts. Development in the other blocks will continue to be monitored.

Even though block 104 is less than 5 miles from the base station, it is still shifted 300-400 feet. All the blocks treated so far have been shifted by 300-400 feet in the same direction. The contractor and the FS will try to figure out the cause of this shift and then correct it.

May 17 The project area experienced warm and wet weather.

May 18 Warm and wet weather was experienced again on the project area. Larvae and foliage development has progressed rapidly over the last couple of days.

Still are not sure what is causing the blocks to be shifted 300-400 feet. A potential cause of the problem is that the wrong map datum was used when the blocks were originally digitized. The pilots however, are reluctant to change any information in their DGPS units. The pilots suspect that the blocks were incorrectly digitized and will redigitize the blocks themselves.

May 19 Weather is still unfavorable in the morning for spraying, but is forecasted to improve. Most of the blocks have enough development to allow treatment. Since there are plenty of blocks ready for treatment, the second spray aircraft (N5055X) , piloted by Roy Staley, arrives at Elkins. Favorable spray conditions existed in the evening when 1,000 acres of block 106 are sprayed.

The spray block is still shifted by 300-400 feet.

May 20 Favorable spray conditions existed in both the morning and the evening. Sprayed block 110, 1277.2 acres in block 103 and 309 acres in block 106 in the morning and all of block 503 in the evening. A total of 3317.2 acres were treated for the day.

Some of the spray blocks are located correctly while others are still shifted. This continues over the next several spray windows.

May 21 Favorable weather conditions existed in the morning. Block 105 was sprayed first, then 342.8 acres were sprayed in block 103 to finish it, then block 107 was sprayed and finally 521 acres in block 108 were sprayed. Spray operations were terminated at 1113 due to gusty winds and low humidity. As early as 1130, an unexpected rain hit the project area. The rain varied from .02 inches in Elkins to .75 inches in Parsons. Due to the short drying time the *B.t.* had in blocks 107 and 108, it was decided that the second application in block 107 would be applied at 36 BIU instead of 24 BIU and the 521 acres treated in block 108 would be retreated (i.e. it would receive two applications at 24 BIU). Not counting the 521 acres, a total of 2751.8 acres were sprayed during the morning. Threatening rain clouds caused the evening spray operations to be cancelled.

May 22 Fog delayed the start of the spray operations until 0930. Sprayed 1,080 acres in block 101 and then terminated treatment due to the lack of *B.t.* It was decided not to waste a good spray window so the second application of Gypchek in the upper portion of block 503 was applied in the evening on a two-day interval instead of the normal three to four-day interval. All the Gypchek spraying is now complete. Approximately 1,509 acres were treated for the day. The second tanker of *B.t.* arrived around 2230.

May 23 Favorable weather conditions in the morning and evening and a replenished supply of *B.t.* enabled a total of 4,101 acres to be treated. One thousand one hundred seventy acres were sprayed in block 101 and 199 acres were sprayed in block 106 to complete the first application in these blocks. Blocks 102, 108, 111 and 113 were sprayed in their entirety.

May 24 Sprayed block 104 and half of block 107 (781.4 acres) in the morning. Windy conditions forced the termination of spray operations in the morning at 0910 and forced the cancellation of an evening spray. Acres treated for the day were 1695.4.

May 25 Weather conditions looked very unfavorable as forecasts predicted an 80 percent chance of rain. Due to these forecasts. the next targeted spray window is on the evening of May 26. The third tanker of *B.t.* arrives around 1000.

May 26 Favorable weather conditions permited an evening spray. Block 107 is finished and then 109 was treated. Even though each spray plane had just enough material to finish block 109, each came back with approximately 90 gallons. The DGPS units were "painting" 150 foot swath instead of a 100 foot swath. The gaps between the swaths of the aircraft will be filled in during the next spray day. Approximately 1136.2 acres were treated.

May 27 Fog delays the start of the spray operation until 0936. After finishing block 109, block 112 and 540 acres in block 105 were sprayed. Windy conditions terminated spray operations at 1209 and prohibited an evening spray. Approximately 1207.4 acres were treated.

The spray blocks are now shown in their correct locations but the spray planes are not receiving a good signal from the repeater plane or the base station. If they are more than half a mile from the base station, the signal reception is poor.

May 28 Unfavorable weather conditions existed so spray operations are cancelled.

May 29 Unfavorable weather conditions still existed.

May 30 Weather improved during the day. Spray planes were sent out in the evening but a brief shower when the planes were near the block forced the cancellation of the spray operations.

The booster amplifier is malfunctioning in the base station so the contractor takes it off. Instead of putting out 20 watts, the base station will put out 1.5 watts. In a trial run, the planes are receiving a good signal from the base station even when they are several miles away.

May 31 Low clouds and fog delayed spray operations until 0900. Despite the late start, it was a very productive day with two good spray windows. Block 105 was finished; blocks 106 and 108 were treated in their entirety along with 2000 acres in block 101. A total of 5,822 acres were treated.

The DGPS system is now working correctly.

June 1 Spray operations get an early start as the spray planes take off at 0602. Block 101 was finished (197 acres) and 1477 acres of block 103 were treated. This block could have been finished but the tanker of B.t. was empty. Seventy-one more gallons are needed to finish this block. For the day, 1,674 acres were treated.

June 2 Inclement weather and the lack of *B.t.* forced the cancellation of spray operations in the morning. Twelve 55-gallon barrels of *B.t.*, enough to complete the project, are delivered around 1500. Inclement weather still existed in the evening.

June 3 Unfavorable weather remained in the project area. No spraying is conducted.

June 4 Fog and low clouds delayed take-off until 1025. Block 301 is treated and 142 acres are sprayed in block 103 to finish it.

After 31 days, the spray project is now complete. A treatment summary is presented in Appendix E. The production rate was 760 acres per hour. The production rate was calculated by dividing the total acres treated by the total number of flight hours of a spray aircraft. Due to inclement weather, the average spray window was 1.42 hours per day.

DISCUSSION/RECOMMENDATIONS

Outside of the weather, the project ran fairly smoothly. The three biggest problems encountered were the DGPS system, communications, and a insufficient supply of *B.t.*

Although the DGPS system was not up and running at its full capability until May 31, it was still a very useful tool. The problems encountered with DGPS were very frustrating but understandable when you consider that: this was only the second year DGPS has been used on suppression projects; it was the first year the contractors used DGPS; and the FS personnel involved on the project had little to no experience with DGPS. This was a learning year for those involved with the DGPS.

RECOMMENDATIONS:

1) Make sure correct map datum is used.

2) Let contractor digitize the spray blocks.

3) Make sure contractor has a base station available for entire project.

4) Base station should be deployed in a secure yet readily accessible location.

5) Place repeater in a plane used only for this purpose. It should not be placed in the observation plane.

6) Prior to the start of the project, the spray pilots should fly over the treatment blocks to make sure the DGPS has them located in their correct location.

7) Have a designated DGPS manager at the airport.

Communications in mountainous terrain can be frustrating. An area where communications are good may be only a few yards away from a blind spot. New and existing technology should be used to improve communication. Reception at the airport was very poor, even when coming from as close as the SO.

1) Use cellular phones. Cellular coverage on the Forest will increase so the use of cellular phones will provide better communication from the spray blocks to the operation center.

2) Use vehicle mounted radios instead of hand-held radios.

3) Have an antennae mounted on the roof of the operation center building instead of one mounted 3 feet off the ground.

Spray operations were terminated on two separate days because of the lack of *B.t.* Although the contractor is responsible for acquiring the *B.t.*, the lack of *B.t.* during a good spray window adversely affects and prolongs the project.

1) On a daily basis, the FS will keep contractor informed on the quantity of *B.t.* used and the approximate amount still left at the airport.

APPENDIX A
Gypsy Moth Suppression Project Participants
Monongahela National Forest

MONONGAHELA NATIONAL FOREST

Carl Brushingham
Gary Bustamente
Dave Curry
Mike Ledden
Tim Scherm
Dave Strahin
Scott Wells

FOREST HEALTH PROTECTION

Bob Acciavatti
Karen Felton
Amy Onken
Pete Rush
Rod Whiteman

BOB RUHE AG SERVICE

Joey Gandy
Roy Staley
Roy Vennekotter

WINDANCER AVIATION

Jim "J.D." Dugan

PROFESSIONAL PILOTS, INC.

Chaw Toung

APPENDIX C
Treatment Day Larvae and Foliage Development

			Larvae Development			
Block	Date	Oak Expansion (%)	1st	2nd	3rd	4th
101	5/22,5/23	45	67	33	0	0
101*	5/31,6/1	100	0	57	43	0
102	5/23	75	0	100	0	0
103	5/20,5/21	40	65	35	0	0
103*	6/1,6/4	100	0	57	43	0
104	5/16	25	87	13	0	0
104*	5/24	65	13	86	1	0
105	5/21	45	60	40	0	0
105*	5/27,5/31	100	7	41	47	4
106	5/19,5/20,5/23	35	43	57	0	0
106*	5/31	100	2	40	52	6
107	5/21	45	12	88	0	0
107*	5/24,5/26	100	10	72	18	0
108	5/23	50	7	93	0	0
108*	5/31	100	0	50	50	0
109	5/26,5/27	80	37	49	14	0
110	5/20	30	50	50	0	0
111	5/23	50	0	100	0	0
112	5/27	85	0	83	17	0
113	5/23	65	4	96	0	0
301	6/4	100	0	59	41	0
501	5/7	25	100	0	0	0
501	5/12	40	52	48	0	0
502	5/7	20	100	0	0	0
502	5/12	30	100	0	0	0
503L	5/15	25	98	2	0	0
503L*	5/20	40	32	68	0	0
503U	5/20	25	64	36	0	0
503U*	5/22	50	64	36	0	0

* denotes second application

APPENDIX D
Weather Conditions During Treatment

	Winds		Relative Humidity (%)		Temperature	
Block	Range	Average	Range	Average	Range	Average
101	0-2	1	55-84	70	44-68	55
101	0-5	3	48-78	71	56-73	63
102	0-2	1	42-51	47	72-74	73
103	0-2	1	44-80	65	47-70	56
103	1-3	2	68-78	73	56-62	59
104	0-4	2	47-71	59	49-67	58
104	0-6	3	61-71	66	57-65	61
105	--	0	64-70	67	52-54	53
105	0-7	3	60-91	67	52-78	66
106	0-4	2	51-74	66	47-55	51
106	0-5	3	59-73	66	59-67	64
107	0-4	3	47-77	59	55-69	63
107	0-3	2	69-81	74	65-69	67
108	0-4	2	55-76	65	51-79	61
108	5-10	6	42-57	48	70-75	73
109	0-3	1	59-72	63	63-68	65
110	0-5	2	52-78	67	50-70	57
111	3-4	3	49-51	50	74-75	74
112	1-7	3	61-74	67	60-70	66
113	0-2	1	51-52	51	73-74	73
301	--	0	80-82	81	60-65	63
501	--	0	84-85	85	43-44	44
501	0-3	2	47-48	47	63-64	63
502	--	0	84-85	85	43-44	44
502	0-2	1	53-56	55	63-64	63
503	3-6	4	42-50	46	64-65	64
503	0-5	3	48-54	51	59-63	61
503	0-5	3	48-54	51	59-63	61
503	0-3	1	45-47	46	56-59	57

APPENDIX E
Treatment Summary

Block	Acres	Insecticide	Rate (oz.)	Date	Time
101	1080	B.t.	64	5/22	0946-1036
101	1117	B.t.	64	5/23	0707-0752
101*	2000	B.t.	64	5/31	1823-2030
101*	197	B.t.	64	6/1	0640-0650
102	375	B.t.	96	5/23	1920-1943
103	1277.2	B.t.	64	5/20	0741-1041
103	341.8	B.t.	64	5/21	0740-0802
103*	1477	B.t.	64	6/1	0614-0638; 0740-0805
103*	142	B.t.	64	6/4	1238-1315
104	914	B.t.	64	5/16	0827-1019
104*	914	B.t.	64	5/24	0656-0745
105	847	B.t.	64	5/21	0655-0736
105*	540	B.t.	64	5/27	1114-1200
105*	307	B.t.	64	5/31	0953-1006
106	1000	B.t.	64	5/19	1930-2026
106	309	B.t.	64	5/20	0700-0730
106	198	B.t.	64	5/23	1033-1050
106*	1507	B.t.	64	5/31	0924-0950; 1047-1124
107	1563	B.t.	64	5/21	0837-1045
107*	781.4	B.t.	96	5/24	0825-0900
107*	781.6	B.t.	96	5/26	1848-1929
108	2008	B.t.	64	5/23	0832-1028
108*	2008	B.t.	64	5/31	1132-1309; 1808-1818
109	354.8	B.t.	96	5/26	2003-2031
109	242.4	B.t.	96	5/27	0944-1036
110	1092	B.t.	96	5/20	0722-1051
111	146	B.t.	96	5/23	1945-2000
112	425	B.t.	96	5/27	0955-1130
113	256	B.t.	96	5/23	1945-2000
301	643	B.t.	96	6/4	1110-1132
501	205	Gypchek	128	5/7	0655-0713
501*	205	Gypchek	128	5/12	0720-0731
502	138	Gypchek	128	5/7	1915-1932
502*	138	Gypchek	128	5/12	1935-1949
503L	210	Gypchek	128	5/15	2022-2040
503L*	210	Gypchek	128	5/20	1941-1951
503U	429	Gypchek	128	5/20	1952-2015
503U*	429	Gypchek	128	5/22	2005-2030

Appendix B. -- 1995 Gypsy Moth Treatment Blocks